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Current Economic Analysis I-34



Fish Meal and Oil Market Review

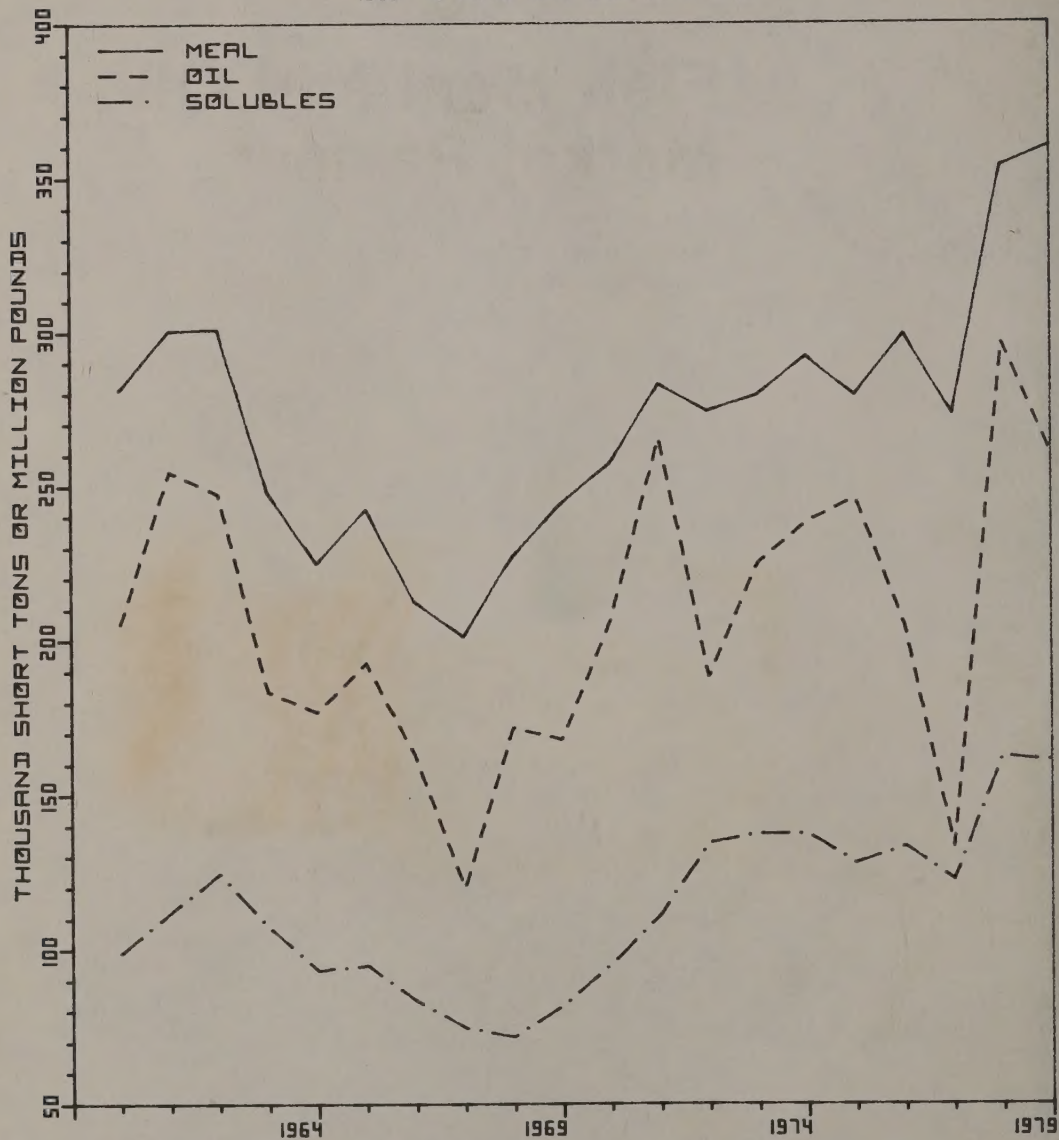
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U.S. DEPARTMENT OF COMMERCE
NATIONAL MARINE FISHERIES SERVICE

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

U.S. PRODUCTION OF FISH MEAL, SOLUBLES, AND OIL,
1960-78 AND 1979 ESTIMATED



Note: Fish meal (excluding shellfish meal) and fish solubles
in thousand short tons; fish oil in million pounds.

FISH MEAL AND OIL MARKET REVIEW

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SUMMARY

High U.S. production in the first half of 1979 suggests that 1979 will be an excellent production year unless further tropical storms curtail production. Record or near-record U.S. output of fish meal, solubles, and oil occurred in 1978.

Continuing improvements, notably in Peru, suggest that production and exports of fish meal for the world and for the major exporting countries could exceed year-earlier levels in 1979, despite resource-related constraints.

The United States was a net importer of fish meal in January-June 1979. The United States received imports of fish meal from Peru and Norway for the first time since 1977. Shipments from Panama increased sharply. Exports declined, particularly to the Federal Republic of Germany, which is usually our leading buyer.

U.S. exports of fish oil recovered sharply from a year earlier in January-June 1979, but U.S. producers will continue to face competition from the Japanese, who increased their exports again in 1979. Peru entered the market again.

Prices of fish meal are expected to remain strong along with prices of all high protein meals. Prices of fish oil have been below prices of soybean oil since spring 1978, but downward pressures on fish oil appear to be less than in 1978.

FISH MEAL

REVIEW: JANUARY-JUNE 1979

Total U.S. production of fish meal exceeded both year-earlier and 1973-77 average levels in the first half of 1979. Imports rose, and exports declined. As in past years the United States was a net importer. Production and exports of the major exporting countries, notably Peru, rose. Prices reflected the continued strength in world prices of all high-protein meals.

Domestic Production

U.S. production of fish meal reached 142,000 short tons in January-June 1979--3 percent above 1978 and 38 percent above the 1973-77 average (table 1).

Table 1.--U.S. supply and use of fish meal (excluding shellfish meal), January-June, 1973-77 average, 1978, and 1979

Component	1973-77 average	1978	1979
-- -Thousand short tons-- - -			
Production			
Menhaden ^{1/}	65.0	105.6	100.0
Anchovy	8.0	0.2	7.6
Tuna-mackerel	19.1	21.4	24.1
Unclassified	10.6	10.9	10.3
Total	102.6	138.1	142.1
Imports	34.4	14.9	54.0
New supplies	137.1	153.0	196.1
Exports	12.0	17.1	8.4
Supplies, net	125.0	135.9	187.7

^{1/} May include small quantities made from other species.

Landings of menhaden in the first half of 1979 were only 4 percent less than in 1978, a peak year. However, data for the first half of 1979 include landings only for the initial

(upswing) part of the main menhaden season (April-October). U.S. production of fish meal moves to a peak in the third quarter because of the large menhaden landings (fig. 1).

Among other fish meals, U.S. output of tuna-mackerel meal exceeded both year-earlier and 1973-77 average levels in January-June 1979; output of unclassified meal was about normal. Production of California anchovy meal also was about normal, easily exceeding low year-earlier levels when price negotiations interrupted harvesting.

U.S. Imports and Exports

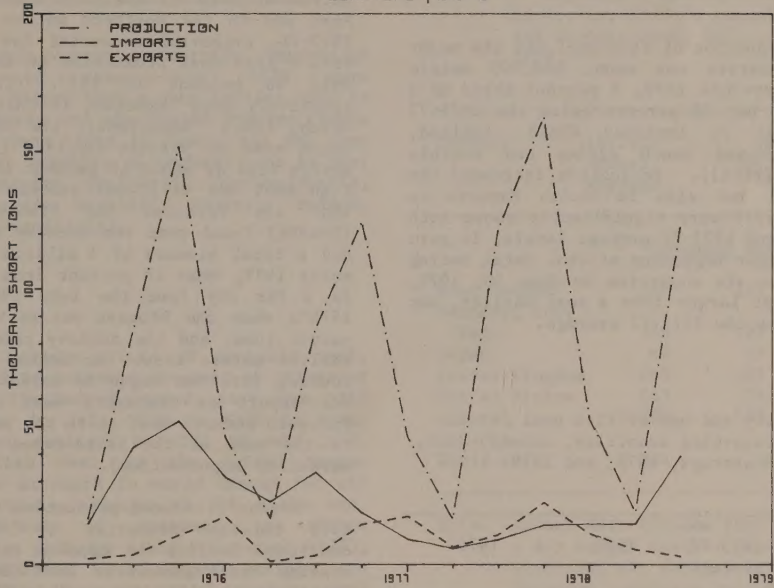
U.S. imports of fish meal were about 54,000 short tons in January-June 1979, three times the low year-earlier levels and 57 percent above the 1973-77 average; exports were half the high year-earlier level and 30 percent below the 1973-77 average.

In the first half of 1979, the United States was a net importer of fish meal (imports exceed exports). By contrast, for the second half of 1977 and for all of 1978, the United States was a net exporter of fish meal (fig. 1) because of ample U.S. production and tight world supplies. U.S. trade is sensitive to relative U.S.-foreign prices; prices of fish meal were higher in Europe than in the United States in most of that period (fig. 2). The price differential was a sufficient incentive for both U.S. and foreign producers to sell significant quantities of fish meal in Europe rather than in the United States. Since September 1978, U.S. prices have been higher, and U.S. imports exceeded exports during the subsequent three quarters.

The United States received imports of fish meal from Peru in December 1978 for the first time since time since February 1977. As in past years, Peru was our leading import supplier (about 21,000 short tons) in the first half of 1979. The United States received shipments from Norway in the first half of 1979 for the first time since August 1977; Norway was the second leading import supplier (about 12,000 short tons). Panama, a relatively new major supplier, substantially increased its shipments from a year earlier to 10,472 short tons, surpassing Canada, a traditional supplier, with 9,750 short tons.

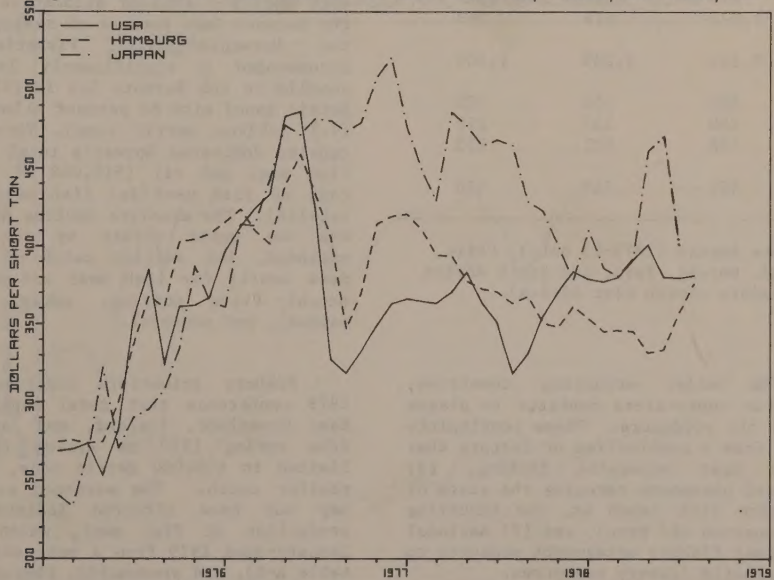
U.S. exports of fish meal in the first half of 1979 went largely to Egypt. Shipments to the Federal Republic of Germany, usually our leading buyer, were low (appendix table A-5).

Figure 1.--U.S. PRODUCTION, IMPORTS, AND EXPORTS OF FISH MEAL, QUARTERLY, 1976-79



Production does not include shellfish meal.

Figure 2.--PRICES OF FISH MEAL IN THE UNITED STATES, EUROPE, AND JAPAN, 1976-79



Hamburg: 65 percent protein, any origin, c & f.

United States: 60 percent menhaden meal, bulk, quoted by brokers at New York City, f.o.b. East Coast and Gulf plants.

Japan: Average unit value of fish meal imported into Japan.

Developments in Major Exporting Countries

Total production of fish meal for six major exporting countries was about 860,000 metric tons in January-June 1979, 5 percent ahead of a year earlier, but 10 percent below the 1973-77 average (table 2; includes Chile, Iceland, Norway, Peru, and South Africa and Namibia [South West Africa]). Production increased the most in Peru, but also in Chile. Exports in January-June 1979 were significantly above both year-earlier and 1973-77 average levels, in part because of larger beginning stocks. Total ending stocks for the six countries on June 30, 1979, were 10 percent larger than a year earlier, but 4 percent below the 1973-77 average.

Table 2.--Supply and use of fish meal for six major exporting countries, January-June, 1973-77 average, 1978, and 1979

Component	1973-77 average	1978	1979
-- -Thousand metric tons-- -			
Beginning stocks	269	290	442
Production	1,072	919	963
Total supply	1,341	1,209	1,405
Exports	590	558	705
Domestic use	158	133	128
Total use	748	691	833
Ending stocks	595	519	570

Note: Includes Angola (1973-75 only), Chile, Iceland, Norway, Peru, and South Africa and Namibia (South West Africa).

Among the major exporting countries, fishery-resource constraints continue to plague fish meal and oil producers. These constraints have resulted from a combination of factors that include: (1) past excessive fishing, (2) cyclical natural phenomena reducing the stock of harvestable size fish (such as, the recurring "El Niño" phenomenon off Peru), and (3) national and international fishery management measures to conserve and rebuild fishery resources.

In Peru, sardines and mackerel are now the dominant species caught in warmer waters north of Lima for reduction into fish meal and oil.

Except for incidental catch, anchovy is harvested only in the more southern waters of Peru and in the northern waters of Chile. In 1972-76, anchovies accounted for 95 percent of Peru's fish meal production on the average, but only 36 percent in 1977. (The anchovy is relatively less important in Chile's industrial catch, too.) Reportedly, the Peruvian anchovy catch rose 50 percent in 1978 (to 1.2 million metric tons or about 40 percent of the catch for fish meal and oil), but another source reports that the Peruvian Sea Fisheries Institute (IMARPE) found that the anchovy stocks off Peru had a total biomass of 4 million metric tons in early 1979, down 20 percent from mid-1978. This is a far cry from the late 1960's and early 1970's when the biomass was perhaps 20 million metric tons, and the anchovy catch was about 10 million metric tons. According to an industry source, Peru has begun to market its fish meal for export as Pescaperu meal rather than as Peruvian anchovy meal as in the past. (Pescaperu is the name of the State-owned production and marketing organization).

Norway's reduced production of fish meal in 1979 relates primarily to that country's continued decline in capelin catch. Norway's capelin catch peaked in 1977 (data in million metric tons): 1975 catch, 1.0; 1976 catch, 2.0; 1977 catch, 2.1; and 1978 catch, 1.3. Comparing January-May 1979 with a year earlier, the capelin catch fell from 761,376 to 543,675 metric tons. The 1979 decline is associated with Norway's reduced allocation of capelin in the Barents Sea. Because of resource conditions, the Norwegian-Soviet Fisheries Commission recommended a significantly lower catch of capelin in the Barents Sea in 1979 (1.8 million metric tons) with 60 percent allocated to Norway (1.1 million metric tons). Through May 1979, capelin dominated Norway's total catch used for fish meal and oil (519,068 of 818,032 metric tons of fish used for fish meal and oil were capelin). The absolute decline of capelin catch was not quite offset by the significantly expanded, but smaller catch of other species used mostly for fish meal and oil production, notably blue whiting, sprat, Norway pout, sandeel, and mackerel.

Fishery scientists concluded at a March 1979 conference that total capelin catch from East Greenland, Iceland, and Jan Mayen waters from spring 1979 to spring 1980 should be limited to 600,000 metric tons, half the year-earlier catch. The worsened stock conditions may not have affected Iceland's early-1979 production of fish meal, which increased in January-June 1979 from a year earlier (appendix table A-8), and presumably, therefore, would not have contributed much to the early-1979 decline in Norway's production, a decline attributed mostly to reduced allocations of capelin in the Barents Sea.

Developments in Major Importing Countries

Among major consuming countries, imports of fish meal in January-June 1979 were significantly higher than a year earlier only in the United States and the United Kingdom (table 3). Imports were lower in Japan, and the same in the Federal Republic of Germany and in East European countries (Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania, and Yugoslavia).

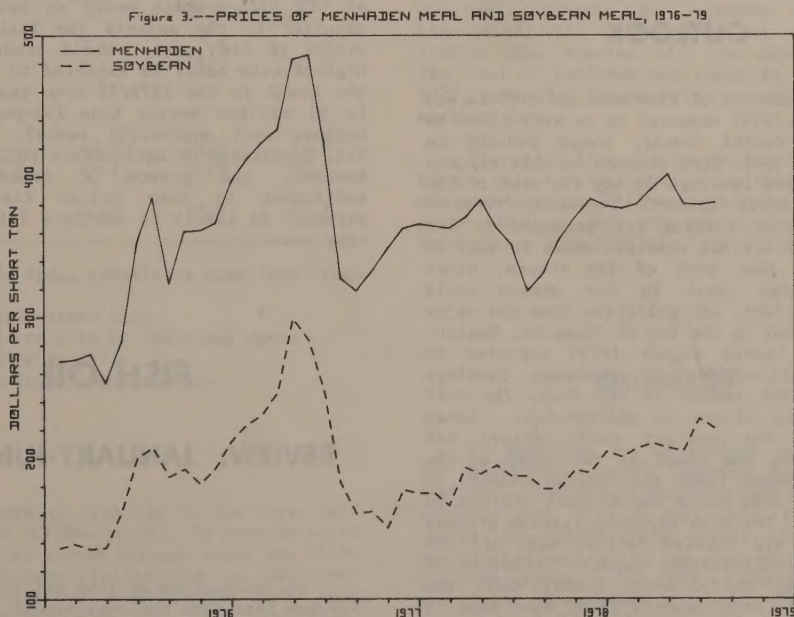
Prices

Monthly average prices of menhaden meal, which are used to indicate movement of prices of fish meal in the United States, rose from \$318 per short ton in July 1978 to \$401 in April 1979, and then declined to \$382 in July 1979. Prices of fish meal in the United States reflected the strength in world demand for all high-protein meals. Prices of all meals are, however, subject to seasonal and other fluctuations. A year ago (July and August 1978), prices of menhaden meal dipped sharply and relatively more than prices of soybean meal (fig. 3). In June and July 1979, prices of menhaden meal were above year-earlier levels; they did not dip as sharply as in 1978, but they

Table 3.--Imports of fish meal in selected countries, 1972-76 annual average, and January-June, 1977, 1978, and 1979

Country	1972-76 annual average	January-June		
		1977	1978	1979
- <u>Thousand metric tons</u> -				
East Europe	480	212	193	193
Germany, Fed. Rep.	344	127	123	123
Japan	60	89	65	54
United Kingdom	263	107	89	126
United States	143	24	7	24
Total	1,290	559	447	520
World total	2,264	na	na	na

Note: Annual data include fish solubles on a dry weight basis. Data for some countries are estimated. The East European countries include Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania, and Yugoslavia. na: not available.



Menhaden meal: 60 percent protein, bulk, f.o.b., East Coast ports.

Soybean meal: 50 percent protein, bulk, Decatur, Ill.

were about 1.7 times the price of soybean meal (50 percent protein, Decatur) as in July 1978. Although these ratios for menhaden-soybean meal prices do not indicate the many technical and price relationships that are taken into account in least-cost feed formulation, lower ratios may at least suggest increased use of fish meal within the range that is nutritionally acceptable in various animal feeds.

As already indicated, prices in Europe, represented by the price of fish meal at Hamburg, have been lower than prices in the United States since September 1978. Prices in Europe had been on a trend downward from \$421 per short ton in December 1977 to \$332 in April 1979; however, they appeared to be gaining strength in June-July 1979 and averaged \$376 in July. Previous upswings since December 1977 were of shorter duration.

Prices of fish meal in Japan had been moving down closer to prices in the United States and Europe from December 1977 through early 1979. Prices in April-November 1977 were about \$470 to \$520 per short ton (about 140,000 to 145,000 yen per metric ton). They moved generally down to about \$380 per short ton (80,000 yen per metric ton) in November 1978, and then rose temporarily in April-May 1979, but fell to \$401 per short ton (97,000 yen per metric ton) in June.

OUTLOOK

U.S. production of fish meal in 1979 is now (early August 1979) expected to be very close to year-earlier record levels, about 340,000 to 370,000 short tons. Much depends on what happens to U.S. menhaden landings during the rest of the main season (April-October). Two severe tropical storms prevented fishing for menhaden in the Gulf of Mexico for two separate weeks in what is normally the peak part of the season. Other tropical storms later in the season could curtail production. Oil pollution from the major oil well blowout in the Bay of Campeche, Mexico, is not now (early August 1979) expected to affect significantly U.S. menhaden landings during the 1979 season in the Gulf. The Gulf season legally closes in mid-October. Water currents in the western Gulf carried oil clockwise along the coast as far north as the south Texas coast (near the Mexican border) in the first 64 days since the blowout started on June 3, 1979. The main menhaden fishing grounds in the Gulf are located farther east off the Louisiana and Mississippi coasts. Landings of menhaden along the Atlantic coast, where the season extends into January 1980, have been 15 to 20 percent ahead of year-earlier levels in most producing areas, which indicates the possibility of another excellent year.

Developments in six major exporting countries in January-June 1979 indicate that world production and exports of fish meal in 1979 could be modestly higher than in 1978. These countries account for a larger share of world exports than of world production, and their exports form a substantial part of the supplies that affect the prices of fish meal. Total production and exports in these six countries were higher in the first six months of 1979 than a year earlier. For the year, Peru's production could be 20 percent higher than in 1978; that is, roughly 680,000 metric tons of fish meal. Norway's fish meal production could be 300,000 metric tons, 10 percent less than in 1978. The outcome depends on the following factors: success in reaching the capelin allocation in the Barents Sea (1.1 million metric tons), results from fishing for capelin near Jan Mayen in light of apparently worsened conditions of stocks, and success in boosting catch of other species. As previously mentioned, concern about capelin in the waters of Iceland, Jan Mayen, and East Greenland led scientists to recommend that catch from these stocks (or stock) be cut in half from year-earlier levels. This would affect fish meal production in both Iceland and Norway among the major exporting countries.

Prices of fish meal are expected to remain strong in 1979. Forces that determine the prices of all high-protein meals as well as factors peculiar to the markets for fish meal affect prices of fish meal. World production of all high-protein meals is expected to be well above the trend in the 1978/79 crop year, increasing to 83 million metric tons (44-percent protein soybean meal equivalent basis), according to U.S. Department of Agriculture (USDA) estimates. However, the growth of demand has been sufficient to keep prices rising. Price strength is likely to continue into the 1979/80 crop year.

FISH OIL

REVIEW: JANUARY-JUNE 1979

U.S. production of fish oil in January-June 1979 was less than the near-record, year-earlier levels, but exports were higher than a year earlier. Prices have remained well below those for soybean oil.

U.S. production of fish oil was 94.5 million pounds in January-June 1979, 12 percent less than a year earlier, but 36 percent more than the 1973-77 average (table 4). Menhaden accounted for more than 90 percent of U.S. fish oil production. Because menhaden oil production was down 15.5 percent compared with a drop of only 3.7 percent for menhaden landings, the decline in oil yield explains lower U.S. output of fish oil. Oil yields were excellent in 1978.

Table 4.--Supply and utilization of fish oil, January-June, 1973-77 average, 1978, and 1979

Component	1973-77 average	1978	1979
- - - <u>-Million pounds-</u> - - -			
New supplies			
Production			
Menhaden ^{1/}	63.3	107.1	90.4
Anchovy	1.2	0.1	0.4
Tuna-mackerel	2.5	1.8	1.7
Unclassified	2.6	2.1	2.0
Total	69.6	111.1	94.5
Imports ^{2/}	-	7.3	4.5
Total	-	118.5	99.1
Use			
Exports ^{3/}	40.9	35.1	59.8
Domestic use ^{4/}	16.1	15.9	17.2
Total	57.0	50.0	77.1

- ^{1/} May include small quantities made from other species.
^{2/} Excludes fish liver oils.
^{3/} May include exports of whale and sperm oil beginning in 1978.
^{4/} Use in inedible products only.

U.S. exports of fish oil in the first half of 1979 were 60 million pounds, 70 percent ahead of a year earlier and 46 percent above the 1973-77 average. Differences in carryover stocks, which were low following the "lean" year 1977 and high following the "fat" year 1978, made this improvement possible. The U.S. domestic use of fish oil in January-June 1979 of 17 million pounds was 8 percent above last year

and 7 percent above the 1973-77 average. Fish oil is used in various inedible products in the United States, including protective coatings, fatty acids, resins and plastics, lubricants, and other products. According to industry sources, increased production of protective coatings has boosted usage of fish oil and linseed oil. Compared with other competing ingredients, favorable prices have helped to increase use of fish oil.

Studies of animal feeding will be made under contract with the National Marine Fisheries Service (NMFS) as part of a petition development for submission to the U.S. Food and Drug Administration (FDA) to permit direct human consumption of partially hydrogenated, deodorized menhaden oil. Fish oil had been used in edible products in the United States in the past, and is currently used in edible products in Canada, Europe, and other parts of the world. The International Association of Fish Meal Manufacturers (IAFMM) is funding an animal life-span study on the use of fish oil for human consumption.

Among major fish oil exporting countries, foreign sales increased sharply for the United States and Japan in 1979. For the first six months of the year, Japanese exports of fish oil were as follows (in thousand metric tons): 29.1 in 1977, 57.4 in 1978, and 65.4 in 1979. Most of the increase in Japanese exports was associated with improvements in abundance of sardine-like species off the Japanese coast. The rate of increase was lower in 1979 than in 1978, comparing January-June exports with year-earlier data.

Prices of fish oil in the United States and Europe have remained well below those of soybean oil since spring 1978--about 19 to 22 cents per pound (\$420 to \$480 per metric ton). Prices in Europe have been slightly higher (fig. 4).

OUTLOOK

As indicated in the outlook for fish meal, the mid-season (early August) expectation is that U.S. landings of menhaden and production of menhaden meal will be quite high in 1979, much closer to record 1978 levels than had been anticipated earlier in the year--barring further tropical storms in the Gulf of Mexico. However, oil yields of menhaden are down. If differences in the first half of 1979 hold, U.S. production of fish oil could be close to 260 million pounds in 1979 compared with 296 million pounds in 1978 and the 1973-77 average of 209 million pounds.

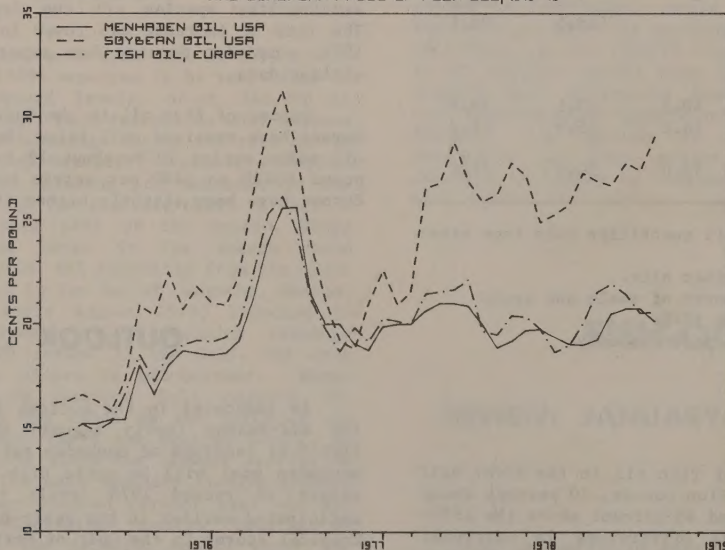
Table 5 shows estimated exports of fish oil for major exporting countries and the world. (Japanese exports could be about 240,000 metric tons if increases for the first half of 1979 hold.) Because exports are a primary factor in price determination, these estimates of exports for 1979 suggest that there will be less downward pressure on prices of fish oil than in 1978. World exports of fish oil peaked at 750,000 metric tons in 1972, but were about 550,000 to 600,000 metric tons in 1973-77. The estimated world exports for 1979 are 4 percent higher than 1978 exports, which were 23 percent higher than 1977 exports. In 1959-78, the ratio of menhaden oil prices to soybean oil prices averaged 0.74. The ratio was higher in 1976-77, but was closer to the 1959-78 average from spring 1978 through July 1979.

Table 5.--Exports of fish oil, crude and refined, selected countries, 1972-76 average, 1977, 1978, and 1979 estimates

Country	1972-76 average	1977	1978	1979 estimate
-- -Thousand metric tons-- - -				
Canada	8	16	9	10
Chile	13	32	51	55
Denmark	64	74	66	60
Iceland	27	74	73	75
Japan	80	107	210	220
Norway	106	143	100	80
Peru	102	-	nil	35
South Africa	22	-	14	14
United States	92	41	101	100
Subtotal	514	487	624	649
Other	92	81	77	80
World total	606	568	701	729

Sources: FAO, Yearbook of Fishery Statistics, 1977 (Fishery Commodities), Vol.45; Oil World Weekly; David Geddes, Ltd. (London); U.S. Bureau of the Census; and Japan Tariff Assoc., Japan Exports and Imports. All 1979 data and some other data are estimated.

Figure 4.--U.S. PRICES OF FISH OIL AND SOYBEAN OIL, AND EUROPEAN PRICE OF FISH OIL, 1976-79



Soybean oil, United States: crude, tank cars, f.o.b. at Decatur, Ill.

Menhaden oil, United States: crude, tank cars, f.o.b. East Coast plants, quoted at New York City.

Fish oil, N.W. Europe: crude, any origin.

REVIEW: 1978 IN BRIEF

Table 6.--U.S. supplies of fish meal (excluding shellfish meal), 1972-76 average, 1977, and 1978

Component	1972-76 average	1977	1978
- - - Thousand short tons- - -			
Production			
Menhaden ^{1/}	198.0	193.3	276.5
Anchovy	19.4	18.9	2.1
Tuna-mackerel	42.5	39.2	50.6
Unclassified	24.7	21.7	24.5
Total	284.6	273.0	353.7
Imports	157.5	81.5	43.9
New supplies	442.1	354.5	397.6
Exports	29.5	36.1	50.7
Supplies, net	412.6	318.4	346.9

^{1/} May include small quantities made from other species.

Table 7.--Supply and use of fish meal for major exporting countries ^{1/}, 1972-76 average, 1977, and 1978

Component	1972-76	1977	1978
- - - Thousand-metric-tons- - -			
Beginning stocks	394.3	329.3	291.4
Production	1,590.2	1,478.5	1,614.3
Total supply	1,984.5	1,807.8	1,905.6
Exports	1,414.4	1,202.0	1,212.8
Domestic use	311.5	314.9	264.9
Total disappearance	1,725.9	1,516.9	1,477.7
Ending stocks	256.9	291.4	428.0

^{1/} Includes Chile, Iceland, Norway, Peru, and South Africa and Namibia.

Table 8.--U.S. supplies of fish solubles, 1972-76 average, 1977, and 1978

Component	1972-76 average	1977	1978
- - - Thousand short tons- - -			
Production			
Menhaden ^{1/}	98.1	87.9	132.0
Unclassified	35.9	34.9	30.2
Total	134.0	122.3	162.5
Imports	0.3	0.8	^{2/}
Total new supplies	134.3	123.2	162.5

^{1/} May include small quantities made from other species.

^{2/} Data not reported separately beginning in 1978.

Table 9.--U.S. supply and use of fish oil, 1972-76 average, 1977 and 1978

Component	1972-76 average	1977	1978
- - - - Million pounds- - - -			
New supplies			
Production			
Menhaden ^{1/}	196.8	116.1	284.0
Anchovy	7.7	6.2	0.8
Tuna-mackerel	6.4	3.8	4.4
Unclassified	9.3	7.1	7.1
Total	220.3	133.2	296.3
Imports	12.2	13.7	16.0
Total	232.4	146.9	312.3
Use			
Exports	202.2	90.6	^{2/} 222.0
Domestic use	33.1	35.4	33.8
Total	235.4	129.1	255.8

^{1/} May include small quantities made from other species.

^{2/} May include exports of whale and sperm oil.

STATISTICAL APPENDIX

The Secretary of Commerce has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this department.

Table A 1.--Fish meal production, imports, and chick placements, 1959-78 1/

Year	Fish meal production				Imports				Total production plus imports	Chick placements
	Menhaden	Tuna and mackerel	Other species	Total	From Peru	From Canada	From other countries	Total		
	-Thousand short tons-									-Million birds-
1959	223.9	25.4	47.5	296.8	49.9	39.0	44.0	132.9	429.7	1,632.7
1960	218.4	26.5	36.5	281.4	68.2	31.0	32.4	131.6	413.0	1,738.3
1961	247.6	21.2	31.7	300.5	151.4	38.2	28.2	217.8	518.3	1,916.5
1962	239.7	26.6	34.7	301.0	186.2	42.8	23.2	252.3	553.3	1,993.9
1963	182.4	27.0	36.8	248.0	285.4	51.0	39.9	376.3	624.3	2,054.4
1964	160.4	21.1	43.6	225.1	348.0	54.8	36.3	439.1	664.2	2,149.6
1965	176.0	25.4	41.1	242.3	209.8	43.8	17.0	270.7	513.0	2,368.8
1966	135.0	25.3	52.1	212.4	276.6	43.6	127.5	447.8	660.2	2,594.4
1967	119.1	25.5	56.8	201.4	442.5	46.6	162.3	651.5	852.9	2,594.8
1968	143.2	28.8	55.0	227.0	635.9	65.1	154.2	855.3	1,082.3	2,621.7
1969	159.5	26.9	57.8	244.1	218.1	67.8	72.4	358.4	602.5	2,847.1
1970	188.6	26.7	41.8	257.0	153.2	75.4	22.8	251.5	508.5	3,000.9
1971	221.0	29.3	32.6	282.9	199.6	57.6	26.0	283.2	566.1	2,982.2
1972	193.6	43.2	37.3	274.1	352.2	27.6	12.1	392.0	666.1	3,105.2
1973	188.8	43.6	46.7	279.1	41.8	24.6	2.2	68.5	347.5	3,038.3
1974	203.9	48.2	39.5	291.7	29.4	30.3	8.6	68.3	359.9	2,942.8
1975	191.4	37.2	50.5	279.2	75.5	34.0	8.9	118.4	397.6	3,009.0
1976	212.6	40.1	46.4	299.0	79.4	34.0	27.0	140.4	439.4	3,325.8
1977	193.3	39.2	40.5	273.0	15.6	24.8	41.1	81.5	354.5	3,475.4
1978	276.5	50.6	26.6	353.7	6.6	32.7	4.6	43.9	397.6	3,702.7

1/ Excludes meal made from shellfish.

Note: Figures may not add to total because of rounding.

TABLE A 2.--SUPPLIES OF FISH MEAL IN THE UNITED STATES, BY MONTH, 1973-77 AVERAGE, AND 1978-79

	PRODUCTION			IMPORTS			TOTAL NEW SUPPLIES			EXPORTS			TOTAL		
	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979
	- THOUSAND SHORT TONS -														
JANUARY	5.4	5.7	7.9	4.9	3.1	10.6	10.3	8.8	18.6	3.2	0.8	0.8	7.1	8.0	17.8
FEBRUARY	4.4	4.8	4.9	2.9	1.5	2.2	7.4	6.4	7.1	2.8	1.8	3.8	4.6	4.6	3.4
MARCH	6.2	5.8	5.9	3.0	1.3	1.8	9.1	7.2	7.8	1.1	3.7	0.8	8.0	3.5	7.0
1ST QTR	16.0	16.4	18.8	10.8	5.9	14.7	26.8	22.3	33.5	7.1	6.3	5.4	19.7	16.0	28.1
APRIL	14.0	20.1	12.1	8.3	3.0	9.2	22.2	23.1	21.3	2.1	3.9	0.3	20.1	19.2	21.0
MAY	28.1	35.5	43.3	8.1	3.5	11.8	36.2	39.1	55.2	1.2	1.2	0.3	35.0	37.8	54.9
JUNE	44.6	66.1	67.8	7.3	2.4	18.3	51.9	68.5	86.0	1.6	5.7	2.4	50.3	62.8	83.7
2ND QTR	86.6	121.7	123.2	23.7	9.0	39.3	110.3	130.7	162.5	4.9	10.8	3.0	105.4	119.9	159.5
JULY	54.8	58.7		11.8	5.3		66.6	63.9		2.8	6.1		63.7	57.8	
AUGUST	46.7	58.8		12.1	5.6		58.8	64.4		3.5	8.8		55.2	55.6	
SEPTEMBER	34.6	45.2		14.2	3.4		48.9	48.6		4.5	7.5		44.4	41.0	
3RD QTR	136.1	162.7		38.2	14.3		174.2	177.0		10.8	22.5		163.4	154.5	
OCTOBER	19.6	31.8		9.0	3.2		28.5	35.0		5.1	6.6		23.4	28.4	
NOVEMBER	13.7	10.5		11.1	2.8		24.8	13.4		1.8	3.1		23.0	10.2	
DECEMBER	12.5	10.6		3.2	8.7		15.6	19.3		4.9	1.4		10.7	17.9	
4TH QTR	45.7	52.9		23.3	14.7		68.9	67.6		11.9	11.1		57.1	56.5	
TOTAL	284.4	353.7	142.0	95.8	43.9	54.0	380.2	397.6	196.0	34.7	50.7	8.4	345.6	346.9	187.6

NOTE: PRODUCTION EXCLUDES MEAL FROM SHELLFISH. 1979 FIGURES ARE PRELIMINARY.
FIGURES MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.

SOURCE: NMFS, RESOURCE STATISTICS DIVISION; BUREAU OF THE CENSUS.

TABLE A 3.—U.S. PRODUCTION OF FISH MEAL BY SPECIES, BY MONTH, 1973-77 AVERAGE, AND 1978-79

	ANCHOVY			MENHADEN			TUNA AND MACKEREL			UNCLASSIFIED			TOTAL		
	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979
	THOUSAND SHORT TONS														
JANUARY	1.6	0.2	(1)	0.3	2.0	3.4	2.5	2.4	3.5	1.0	1.1	1.0	5.4	5.7	7.9
FEBRUARY	1.0	—	—	—	—	—	2.4	2.9	3.9	1.0	1.9	1.0	4.4	4.8	4.9
MARCH	0.9	(2)	—	—	—	—	3.8	4.0	4.5	1.5	1.8	1.4	6.2	5.8	5.9
1ST QTR	3.5	0.2	—	0.3	2.0	3.4	8.7	9.4	11.9	3.6	4.8	3.5	16.0	16.4	18.8
APRIL	3.1	(2)	2.2	5.5	14.7	4.5	3.7	4.0	3.9	1.7	1.4	1.5	14.0	20.1	12.1
MAY	1.4	(2)	4.6	21.3	29.2	31.1	3.2	4.0	4.9	2.2	2.3	2.7	28.1	35.5	43.3
JUNE	—	(3)	0.9	37.9	59.6	60.8	3.6	4.0	3.5	3.1	2.4	2.7	44.6	66.1	67.8
2ND QTR	4.5	—	7.6	64.7	103.6	96.4	10.4	12.0	12.3	7.0	6.2	6.9	86.6	121.7	123.2
JULY	—	—	—	47.6	52.2	—	3.8	4.1	—	3.3	2.4	—	54.8	58.7	—
AUGUST	0.1	(3)	—	39.3	51.0	—	3.9	4.8	—	3.3	3.0	—	46.7	58.8	—
SEPTEMBER	1.3	(3)	—	27.1	31.5	—	3.6	5.1	—	2.6	2.6	—	34.6	45.2	—
3RD QTR	1.5	—	—	114.1	140.7	—	11.3	14.0	—	9.2	7.9	—	136.1	162.7	—
OCTOBER	3.5	0.5	—	10.3	23.8	—	3.9	4.7	—	1.9	2.7	—	19.6	31.8	—
NOVEMBER	4.1	0.9	—	4.9	2.4	—	3.6	5.6	—	1.1	1.7	—	13.7	10.5	—
DECEMBER	4.0	0.4	—	3.6	4.0	—	3.7	4.9	—	1.1	1.2	—	12.5	10.6	—
4TH QTR	11.5	1.9	—	18.9	30.2	—	11.2	15.2	—	4.0	5.6	—	45.7	52.9	—
TOTAL	21.0	2.1	7.6	198.0	276.5	99.9	41.7	50.6	24.1	23.8	24.5	10.4	284.4	353.7	142.0

(1) INCLUDED WITH UNCLASSIFIED.

(2) INCLUDED WITH JANUARY.

(3) INCLUDED WITH OCTOBER.

NOTE: PRODUCTION EXCLUDES MEAL FROM SHELLFISH.

FIGURES MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING. 1979 FIGURES ARE PRELIMINARY.

SOURCE: NMFS, RESOURCE STATISTICS DIVISION.

TABLE A 4.—U.S. IMPORTS OF FISH MEAL BY COUNTRY OF ORIGIN, BY MONTH, 1973-77 AVERAGE, AND 1978-79

	CANADA			NORWAY			PERU			OTHER COUNTRIES (2)			TOTAL		
	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979
	THOUSAND SHORT TONS														
JANUARY	1.2	1.1	1.5	0.5	—	1.4	2.8	—	3.5	0.3	1.9	4.3	4.9	3.1	10.6
FEBRUARY	1.0	1.4	1.0	0.1	—	1.2	1.8	—	—	(1)	0.1	—	2.9	1.5	2.2
MARCH	1.6	1.3	1.8	0.7	—	—	—	—	—	0.7	—	(1)	3.0	1.3	1.8
1ST QTR	3.9	3.9	4.3	1.3	—	2.6	4.6	—	3.5	1.0	2.0	4.3	10.8	5.9	14.7
APRIL	2.4	2.9	2.7	1.6	—	—	2.7	—	6.3	1.5	0.1	0.2	8.3	3.0	9.2
MAY	2.4	3.5	1.5	1.1	—	2.9	3.5	—	4.7	1.1	—	2.7	8.1	3.5	11.8
JUNE	2.5	2.4	1.2	2.1	—	6.3	2.3	—	6.8	0.5	—	4.0	7.3	2.4	18.3
2ND QTR	7.3	8.9	5.5	4.8	—	9.1	8.5	—	17.8	3.1	0.1	6.9	23.7	9.0	39.3
JULY	3.4	4.0	—	0.7	—	—	6.7	—	—	1.1	1.2	—	11.8	5.3	—
AUGUST	3.8	4.4	—	0.4	—	—	7.0	—	—	0.9	1.2	—	12.1	5.6	—
SEPTEMBER	3.7	3.4	—	0.7	—	—	9.2	—	—	0.7	(1)	—	14.2	3.4	—
3RD QTR	10.8	11.9	—	1.8	—	—	22.8	—	—	2.7	2.5	—	38.2	14.3	—
OCTOBER	3.8	3.2	—	0.8	—	—	3.8	—	—	0.6	—	—	9.0	3.2	—
NOVEMBER	2.1	2.8	—	—	—	—	8.5	—	—	0.5	—	—	11.1	2.8	—
DECEMBER	1.7	2.0	—	0.7	—	—	—	6.6	—	0.8	—	—	3.2	8.7	—
4TH QTR	7.6	8.1	—	1.4	—	—	12.4	6.6	—	1.9	—	—	23.3	14.7	—
TOTAL	29.5	32.7	9.7	9.3	—	11.8	48.3	6.6	21.3	8.7	4.6	11.2	95.8	43.9	54.0

(1) LESS THAN 50 SHORT TONS.

(2) PRINCIPALLY PANAMA IN 1977-79.

NOTE: FIGURES MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.

SOURCE: BUREAU OF THE CENSUS.

Table A 5.--U.S. fish meal exports, annual, by country of destination, 1972-79

Country of destination	1972	1973	1974	1975	1976	1977	1978	1979 Jan.-June
-----Short tons-----								
Canada	78	2,685	2,163	3,050	1,817	2,076	525	540
Dominican Republic	579	396	690	1,309	412	-	1,160	421
Guatemala	206	160	-	-	-	-	-	-
Mexico	4,759	1,264	8,533	-	-	1,064	351	345
Belgium	-	865	-	-	-	-	-	5
Germany, West	2,407	21,886	33,006	3,066	17,217	22,832	29,803	650
Italy	-	-	275	-	-	-	113	-
Netherlands	270	189	-	-	-	-	-	-
Spain	764	488	466	-	-	-	-	-
United Kingdom	409	1,689	542	-	-	-	50	-
Yugoslavia	-	-	275	-	-	-	-	-
Iran	-	4,297	1,905	-	292	220	2,122	-
Lebanon	-	-	-	-	-	210	-	-
Saudi Arabia	-	-	-	-	-	154	1,297	512
Syria	-	-	-	-	661	-	-	-
Taiwan	-	-	-	-	-	1,781	94	-
Egypt	-	928	6,063	3,274	11,530	6,120	13,903	5,510
Ghana	660	1,542	506	847	782	711	600	-
Libya	-	-	866	-	-	-	-	-
Zaire	-	181	-	-	-	-	-	-
Australia	-	17	-	-	-	-	279	154
Other countries	219	145	225	237	430	935	403	231
Total	10,351	36,732	55,515	11,783	33,141	36,103	50,700	8,368

Source: Bureau of the Census.

TABLE A 6.--BROILER CHICKS PLACED IN 21 STATES, AND AVERAGE BROILER PRICE AT THE FARM, BY MONTH, 1973-77 AVERAGE, AND 1977-79

TIME PERIOD	CHICKS PLACED				PERCENTAGE CHANGE IN CHICKS PLACED			BROILER PRICE AT THE FARM		
	1973-77 AVERAGE	1977	1978	1979	IN 1977 FROM 1973-77 AVG.	IN 1978 FROM 1977	IN 1979 FROM 1978	1977	1978	1979
	----- MILLION -----					----- PERCENT -----		----- CENTS/LB -----		
JANUARY	261.4	282.6	300.4	327.4	+ 8.1	+ 6.3	+ 9.0	21.9	22.9	27.0
FEBRUARY	243.6	261.3	277.2	299.4	+ 7.3	+ 6.1	+ 8.0	24.3	24.8	28.9
MARCH	283.6	308.0	318.1	350.8	+ 8.6	+ 3.3	+ 10.3	24.2	25.0	28.9
1ST QTR	788.6	851.9	895.7	977.6	+ 8.0	+ 5.1	+ 9.1	23.5	24.2	28.3
APRIL	280.3	307.3	320.1	354.1	+ 9.6	+ 4.2	+ 10.6	24.2	27.8	28.2
MAY	289.0	319.3	339.7	369.7	+ 10.5	+ 6.4	+ 8.8	24.1	27.8	29.0
JUNE	277.5	306.0	329.5	361.8	+ 10.3	+ 7.7	+ 9.8	24.9	30.5	26.4
2ND QTR	846.8	932.6	989.3	1,085.6	+ 10.1	+ 6.1	+ 9.7	24.4	28.7	27.9
JULY	265.7	297.7	322.4	349.7	+ 12.0	+ 8.3	+ 8.5	25.9	31.6	25.5
AUGUST	261.8	282.3	304.2	-	+ 7.9	+ 7.7	-	24.1	26.2	-
SEPTEMBER	241.5	268.4	283.2	-	+ 11.1	+ 5.5	-	23.8	26.2	-
3RD QTR	769.0	848.4	909.7	-	+ 10.3	+ 7.2	-	24.6	28.0	-
OCTOBER	243.2	278.2	295.7	-	+ 14.4	+ 6.3	-	22.7	24.6	-
NOVEMBER	246.1	270.7	294.7	-	+ 10.0	+ 8.9	-	21.3	24.5	-
DECEMBER	264.5	293.6	317.6	-	+ 11.0	+ 8.2	-	20.2	24.9	-
4TH QTR	753.8	842.5	908.0	-	+ 11.8	+ 7.8	-	21.4	24.7	-
TOTAL	3,158.3	3,475.4	3,702.7	2,412.9	+ 10.0	+ 6.5	-	23.5	26.4	27.7

FIGURES MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING. 1979 FIGURES ARE PRELIMINARY.

SOURCES: DELMARVA BROILER CHICK REPORT, U.S. DEPARTMENT OF AGRICULTURE, STATISTICAL REPORTING SERVICE, AND POULTRY AND EGG SITUATION, U.S. DEPARTMENT OF AGRICULTURE, ECONOMIC RESEARCH SERVICE.

TABLE A 7.—SUPPLY AND UTILIZATION OF FISH MEAL IN MAJOR EXPORTING COUNTRIES, JANUARY-DECEMBER 1977 AND 1978

COUNTRY AND PERIOD	BEGINNING INVENTORY	PRODUCTION	SUBTOTAL	EXPORTS	DOMESTIC CONSUMPTION	ENDING INVENTORY
----- METRIC TONS -----						
1977						
FEO COUNTRIES (1)						
CHILE	36,352	220,628	256,980	198,630	13,048	45,790
ICELAND	3,665	169,558	173,223	149,204	4,800	19,118
NORWAY	139,358	464,799	604,157	450,310	25,438	128,409
PERU	148,033	452,377	600,410	394,697	113,593	89,679
SOUTH AFRICA	1,908	171,400	173,308	9,165	156,870	7,273
FEO TOTAL	329,316	1,478,762	1,808,078	1,202,006	313,749	290,269
OTHER COUNTRIES						
CANADA	3,589	44,531	48,120	27,626	16,531	4,427
DENMARK	7,000	300,000	307,000	261,800	(2)	(2)
GRAND TOTAL	339,905	1,823,293	2,163,198	1,493,432	(2)	(2)
1978						
FEO COUNTRIES (1)						
CHILE	45,790	327,552	373,342	289,741	11,714	72,975
ICELAND	19,118	200,360	219,478	204,005	4,800	10,673
NORWAY	128,409	330,479	458,888	293,840	30,521	134,527
PERU	89,679	573,893	663,572	420,171	70,012	173,389
SOUTH AFRICA	7,273	182,000	189,273	5,000	147,881	36,392
FEO TOTAL	290,269	1,614,284	1,904,553	1,212,757	264,928	427,956
OTHER COUNTRIES						
CANADA	4,427	57,832	62,259	35,565	23,556	3,480
DENMARK	(2)	320,000	(2)	246,600	(2)	(2)
GRAND TOTAL	(2)	1,992,116	(2)	1,494,922	(2)	(2)

TABLE A 8.—SUPPLY AND UTILIZATION OF FISH MEAL IN MAJOR EXPORTING COUNTRIES, JANUARY-JUNE 1978 AND 1979

COUNTRY AND PERIOD	BEGINNING INVENTORY	PRODUCTION	SUBTOTAL	EXPORTS	DOMESTIC CONSUMPTION	ENDING INVENTORY
----- METRIC TONS -----						
1978						
FEO COUNTRIES (1)						
CHILE	45,790	162,639	208,429	104,433	5,056	99,457
ICELAND	19,118	105,624	124,742	98,214	2,400	24,128
NORWAY	128,409	197,734	326,143	153,775	13,927	158,441
PERU	89,679	289,095	378,774	201,708	43,922	133,144
SOUTH AFRICA	7,273	164,000	171,273	-	68,125	103,148
FEO TOTAL	290,269	919,092	1,209,361	558,130	133,430	518,318
OTHER COUNTRIES						
CANADA	4,427	25,519	29,946	15,621	6,144	8,485
DENMARK	(2)	164,000	(2)	125,000	(2)	(2)
GRAND TOTAL	(2)	1,108,611	(2)	698,751	(2)	(2)
1979						
FEO COUNTRIES (1)						
CHILE	72,975	191,492	264,467	114,916	4,583	145,260
ICELAND	10,673	113,461	124,134	100,765	2,400	20,444
NORWAY	134,527	177,082	311,609	150,563	13,868	146,186
PERU	187,000	341,481	528,481	334,700	37,518	156,263
SOUTH AFRICA	36,392	139,243	175,635	4,160	69,632	101,843
FEO TOTAL	441,567	962,759	1,404,326	705,104	128,001	569,996
OTHER COUNTRIES						
CANADA	3,480	(2)	(2)	(2)	(2)	(2)
DENMARK	(2)	(2)	(2)	124,000	(2)	(2)
GRAND TOTAL	(2)	(2)	(2)	(2)	(2)	(2)

(1) EXCLUDING ANGOLA, FOR WHICH COUNTRY FIGURES ARE NOT AVAILABLE.

(2) NOT AVAILABLE.

SOURCE: FISHMEAL EXPORTERS ORGANIZATION (FEO), PARIS; OIL WORLD WEEKLY, PUBLISHED BY ISTA MIELKE & CO., HAMBURG; CANADA, FISHERIES AND OCEANS, OTTAWA; AND OTHER SOURCES.

NOTE: FIGURES ARE PRELIMINARY, AND MAY INCLUDE SLIGHT DISCREPANCIES, OWING TO REVISIONS, TO DIFFERENCES IN DEFINITION OR REPORTING PRACTICES AMONG SOURCES AND COUNTRIES, AND TO OTHER POSSIBLE REASONS. FIGURES FOR DENMARK ARE PARTIALLY ESTIMATED.

Table A 9.--FEO exports of fish meal by country of destination, January-December 1977-78

Country of destination	Exports		Percentage of total FEO exports		Percentage change from 1977 to 1978
	1977	1978	1977	1978	
	-Thousand metric tons-		-Percent-		
France	51.2	40.4	4.3	3.3	- 21.1
Germany, Fed. Rep.	180.5	216.9	15.0	17.9	+ 20.2
Holland/Belgium	44.0	41.9	3.7	3.5	- 4.8
Italy	41.8	40.5	3.5	3.3	- 3.1
Portugal	9.6	10.3	0.8	0.8	+ 7.3
Switzerland	10.2	8.5	0.8	0.7	- 16.7
United Kingdom	86.3	98.3	7.2	8.1	+ 13.9
Scandinavian countries	100.4	121.4	8.4	10.0	+ 20.9
East Europe	324.8	367.9	27.0	30.3	+ 13.3
U.S.S.R.	14.2	-	1.2	-	- 100.0
United States	32.6	14.1	2.7	1.2	- 56.8
Cuba	21.4	33.5	1.8	2.8	+ 56.5
Other Latin Am. countries	16.4	27.4	1.4	2.3	+ 67.1
China, P.R.	5.0	14.6	0.4	1.2	+ 192.0
Iran	30.7	58.4	2.6	4.8	+ 90.2
Israel	20.4	13.7	1.7	1.1	- 32.9
Japan	146.7	31.2	12.2	2.6	- 78.7
Taiwan	24.7	37.1	2.1	3.1	+ 50.2
Others	41.18	36.65	3.4	3.0	- 11.0
Total	1,202.08	1,212.75	100.0	100.0	+ 0.9

Note: Recipient countries and categories are those given by FEO.

Source: Fishmeal Exporters Organization (FEO).

Table A10.--FEO exports of fish meal by country of destination, January-May 1978-79

Country of destination	Exports		Percentage of total FEO exports		Percentage change from 1978 to 1979
	1978	1979	1978	1979	
	-Thousand metric tons-		-Percent-		
France	17.8	15.6	3.7	2.7	- 12.4
Germany, Fed. Rep.	78.6	102.5	16.5	17.8	+ 30.4
Holland/Belgium	14.9	12.6	3.1	2.2	- 15.4
Italy	15.3	32.3	3.2	5.6	+ 111.1
Switzerland	4.2	5.3	0.9	0.9	+ 26.2
United Kingdom	22.5	58.8	4.7	10.2	+ 161.3
Scandinavian countries	45.3	53.5	9.5	10.3	+ 31.3
East European countries	154.0	152.6	32.4	26.5	- 0.9
United States	-	18.6	-	3.2	-
Cuba	22.5	17.8	4.7	3.1	- 20.9
Other Latin Am. countries	3.6	5.5	0.8	1.0	+ 52.8
China, P.R.	-	13.9	-	2.4	-
Iran	28.0	-	5.9	-	- 100.0
Israel	4.6	2.9	1.0	0.5	- 37.3
Japan	22.9	32.4	4.8	5.6	+ 40.2
Korea, Rep.	4.1	14.2	0.9	2.5	+ 246.3
Philippines	5.5	5.0	1.2	0.9	- 9.1
Taiwan	21.1	17.4	4.4	3.0	- 17.3
Others	10.7	8.4	2.2	1.5	- 20.7
Total	475.6	575.1	100.0	100.0	+ 20.9

TABLE A 11.—SELECTED AVERAGE MONTHLY WHOLESALE PRICES AND PRICE RATIO OF FISH MEAL TO SOYBEAN MEAL, 1977-79

	MENHADEN (1)	TUNA-MIX (2)	IMPORTED PERUVIAN (3)	NORTHWEST EUROPE (4)	JAPAN (5)	SOYBEAN (6)		MENHADEN MEAL TO 50% PROTEIN SOYBEAN MEAL
						44% PROTEIN	50% PROTEIN	
	----- DOLLARS PER SHORT TON -----							PRICE RATIO
1977								
JANUARY	412.50	323.13	404.50	423.43	413.94	207.00	224.25	1.84
FEBRUARY	423.75	357.50	416.66	410.05	413.18	211.00	230.38	1.84
MARCH	433.33	364.38	(7) 431.25	401.16	443.00	226.20	246.60	1.76
APRIL	(7) 483.13	367.82	(7) 479.38	438.86	477.33	275.62	299.00	1.62
MAY	486.00	390.50	482.50	458.81	471.16	258.25	283.50	1.71
JUNE	423.75	405.97	435.00	433.09	481.70	225.30	247.10	1.71
JULY	327.50	275.00	358.75	405.29	480.17	162.00	182.75	1.79
AUGUST	318.75	247.50	325.00	346.77	473.16	140.30	160.90	1.98
SEPTEMBER	332.50	244.06	335.00	369.95	479.01	143.65	162.40	2.05
OCTOBER	349.00	304.13	345.00	414.13	507.63	135.00	150.75	2.32
NOVEMBER	363.13	275.00	358.33	419.12	520.62	161.70	177.90	2.04
DECEMBER	366.25	288.75	365.00	420.58	476.29	160.13	175.13	2.09
AVERAGE	393.30	320.31	394.70	411.77	469.77	192.18	211.72	1.86
1978								
JANUARY	(8) 364.50	(9)	366.00	409.82	447.81	162.20	175.40	2.08
FEBRUARY	(8) 363.33	(9)	366.67	393.95	428.77	152.88	166.38	2.18
MARCH	370.63	330.00	385.00	393.54	485.56	179.38	193.38	1.92
APRIL	383.33	316.25	400.00	377.62	477.45	173.00	188.75	2.03
MAY	363.50	302.50	(7) 377.50	372.40	464.08	177.40	194.90	1.87
JUNE	351.25	(9)	(9)	370.50	468.07	169.75	187.13	1.88
JULY	318.50	310.75	(9)	363.33	464.35	172.00	187.25	1.70
AUGUST	331.25	302.50	(9)	367.78	428.46	162.90	178.20	1.86
SEPTEMBER	355.00	288.75	(9)	351.08	422.68	163.88	178.25	1.99
OCTOBER	370.50	288.75	371.25	347.91	400.31	176.80	191.70	1.93
NOVEMBER	383.75	288.75	(9)	361.43	377.93	177.13	189.50	2.03
DECEMBER	378.75	292.19	391.67	353.50	410.17	188.75	204.50	1.85
AVERAGE	361.19	302.27	379.73	371.90	439.64	171.34	186.28	1.94
1979								
JANUARY	377.00	346.04	390.50	345.19	385.71	184.90	200.60	1.88
FEBRUARY	380.00	288.75	(7) 390.00	346.09	380.60	190.75	206.63	1.84
MARCH	391.25	347.19	(7) 398.00	345.28	392.40	194.50	210.50	1.86
APRIL	401.00	343.75	410.00	331.58	461.12	191.13	207.13	1.94
MAY	380.00	343.75	388.33	333.67	470.68	188.00	205.00	1.85
JUNE	379.38	343.75	392.50	356.53	401.17	209.63	227.63	1.67
JULY	381.00	357.50	(7) 400.83	376.03		201.60	220.90	1.72
AUGUST								
SEPTEMBER								
OCTOBER								
NOVEMBER								
DECEMBER								
AVERAGE	384.23	338.68	395.74	347.77	415.28	194.36	211.20	1.82

(1) 60 PERCENT PROTEIN, BULK, QUOTED BY BROKERS AT NEW YORK CITY, F.O.B., EAST COAST AND GULF PLANTS.

(2) 55 PERCENT PROTEIN, BULK, LOS ANGELES.

(3) 65 PERCENT PROTEIN, BULK, F.O.B., EAST COAST AND GULF PORTS.

(4) 64-65 PERCENT PROTEIN, ANY ORIGIN, C & F, HAMBURG, FEDERAL REPUBLIC OF GERMANY.

(5) THE AVERAGE UNIT VALUE OF IMPORTS INTO JAPAN OF FISH MEAL AND FLOUR, C.I.F., EXCLUDING ANY DUTIES ON IMPORTS IN EXCESS OF QUOTAS, CONVERTED AT THE AVERAGE MONTHLY CURRENCY EXCHANGE RATE.

(6) BULK, DECATUR, ILL.

(7) NOMINAL PRICE.

(8) ASKING PRICE.

(9) NO QUOTES.

SOURCE: FOR PRICES OF FISH MEAL IN THE UNITED STATES: NMFS, RESOURCE STATISTICS DIVISION. FOR NORTHWEST EUROPE PRICES: OIL WORLD, ISTA MIELKE & CO., HAMBURG, FEDERAL REPUBLIC OF GERMANY. FOR SOYBEAN MEAL PRICES: FEED MARKET NEWS, U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, GRAIN DIVISION. FOR JAPANESE PRICES: JAPAN TARIFF ASSOCIATION, JAPAN EXPORTS AND IMPORTS; IMF, INTERNATIONAL FINANCIAL STATISTICS.

Table A12.--U.S. supplies of fish solubles, 1953-78

Year	Production			Imports	Total supplies
	Menhaden	Other	Total		
-----Thousand short tons-----					
1953	39.5	42.5	81.5	-	81.5
1954	56.3	58.8	115.0	3.6	118.6
1955	61.9	49.0	110.9	3.3	114.2
1956	72.9	56.0	128.8	3.0	131.8
1957	69.4	52.9	122.3	9.7	132.0
1958	72.5	57.7	130.2	14.6	144.8
1959	108.1	57.3	165.4	26.6	192.0
1960	65.8	33.1	98.9	3.2	102.1
1961	73.3	38.9	112.2	6.7	119.0
1962	85.2	39.4	124.6	6.3	130.9
1963	74.8	32.6	107.4	7.1	114.5
1964	68.7	24.6	93.3	4.5	97.8
1965	73.2	21.7	94.8	5.1	100.0
1966	60.8	22.7	83.4	4.3	87.7
1967	51.8	22.9	74.7	3.7	78.3
1968	53.2	18.6	71.8	1.8	73.6
1969	63.3	18.4	81.7	0.2	81.8
1970	71.9	23.1	95.0	.5	95.4
1971	91.5	19.7	111.2	.1	111.2
1972	104.1	30.3	134.4	.1	134.5
1973	104.4	33.1	137.4	.3	137.7
1974	102.9	34.3	137.3	-	137.3
1975	83.6	44.2	127.8	.1	127.9
1976	95.3	37.8	133.1	1.2	134.3
1977	87.4	34.9	122.3	.8	123.2
1978	132.0	30.5	162.5	-	162.5

Note: Figures may not add to total because of rounding; imports not reported separately in 1978.

TABLE A13.--PRODUCTION AND AVERAGE PRICE OF FISH SOLUBLES, BY MONTH, 1973-77 AVERAGE AND 1977-79

	PRODUCTION				PRICE (1)			MENHADEN SOLUBLES TO MENHADEN MEAL		
	1973-77 AVERAGE	1977	1978	1979	1977	1978	1979	1977	1978	1979
-----THOUSAND SHORT TONS-----										
JANUARY	2.0	1.2	2.2	4.4	(2)140.00	(2)135.50	121.50	0.34	0.37	0.32
FEBRUARY	1.5	1.7	1.7	1.6	(2)144.38	(2)137.50	122.50	0.34	0.38	0.32
MARCH	2.9	3.6	1.9	2.4	(2)147.50	(2)137.50	123.13	0.34	0.37	0.31
1ST QTR	6.3	6.5	5.8	8.3	143.96	136.83	122.38	0.34	0.37	0.32
APRIL	7.3	8.9	8.8	5.1	(2)166.88	(2)142.50	124.00	0.35	0.37	0.31
MAY	12.9	10.7	13.0	17.9	(2)177.00	145.50	121.25	0.36	0.40	0.32
JUNE	20.0	18.2	24.9	26.2	(2)176.25	145.00	118.75	0.42	0.41	0.31
2ND QTR	40.2	37.8	46.8	49.3	173.38	144.33	121.33	0.38	0.39	0.31
JULY	23.8	18.6	26.2		(2)149.38	129.50	123.00	0.46	0.41	0.32
AUGUST	21.4	18.3	33.0		(2)128.50	126.25		0.40	0.38	
SEPTEMBER	16.5	19.2	26.2		(2)131.25	131.25		0.39	0.37	
3RD QTR	61.7	56.2	85.3		136.38	129.00		0.42	0.39	
OCTOBER	10.6	11.1	13.7		(2)126.00	132.50		0.36	0.36	
NOVEMBER	7.5	6.1	6.2		(2)127.50	131.25		0.35	0.34	
DECEMBER	5.2	4.6	4.7		(2)133.75	126.25		0.37	0.33	
4TH QTR	23.3	21.8	24.6		129.08	130.00		0.36	0.34	
TOTAL	131.6	122.3	162.5	57.6	145.70	135.04		0.37	0.37	

(1) MENHADEN SOLUBLES IN TANK CARS; PRICE QUOTED BY BROKERS AT NEW YORK CITY, F.O.B. EAST COAST PLANTS.

(2) NOMINAL PRICE.

NOTE: FIGURES MAY NOT SUM TO TOTAL BECAUSE OF ROUNDING. 1979 FIGURES SUBJECT TO REVISION.

SOURCE: NMFS, RESOURCE STATISTICS DIVISION.

Table A14.--Fish oil production, imports, exports, domestic use, and apparent stock changes, 1950-78

Year	U.S. production ^{1/}				Imports 2/	Total supplies ^{3/}	Exports ^{4/}	U.S. industrial utilization ^{2/}	Net changes in stocks	
	Menhaden	mackerel	Herring	Other						Total
-Million pounds-										
1950	76.6	6.6	24.8	52.7	160.7	15.1	175.9	76.0	5/	5/
1951	94.0	5.3	11.3	22.9	133.5	17.4	150.9	49.8	5/	5/
1952	96.7	5.6	8.1	8.2	118.6	15.6	134.2	44.0	5/	5/
1953	133.7	4.9	5.4	6.7	150.7	12.0	162.6	108.5	5/	5/
1954	139.8	4.4	5.7	12.3	162.2	13.0	175.2	141.6	5/	5/
1955	159.2	4.1	8.2	13.6	185.1	10.4	195.5	142.7	74.9	- 22.1
1956	168.2	5.3	13.7	10.1	197.3	10.7	207.9	140.9	81.3	- 14.2
1957	118.5	5.5	14.1	10.1	148.2	7.2	155.4	114.9	83.0	- 42.5
1958	128.0	4.7	13.2	15.7	161.6	4.9	166.6	94.0	67.5	+ 5.1
1959	154.7	4.5	15.0	9.0	183.2	6.8	189.9	144.5	58.6	- 13.2
1960	183.4	3.8	11.5	6.9	205.6	8.9	214.6	143.7	56.8	+ 14.1
1961	235.2	5.7	6.1	7.6	254.6	8.4	263.0	122.5	64.8	+ 75.7
1962	232.6	5.0	5.1	4.8	247.5	10.8	258.2	123.0	62.9	+ 72.3
1963	167.6	5.9	5.7	4.5	183.7	8.6	192.2	262.3	52.1	- 122.2
1964	157.7	4.8	10.3	4.2	177.0	11.8	188.8	151.5	47.7	- 10.4
1965	175.2	4.8	8.5	4.3	192.8	6.0	198.7	103.8	44.5	+ 50.4
1966	144.2	4.1	7.9	6.5	162.7	12.7	175.3	77.3	38.8	+ 59.2
1967	101.4	5.2	5.7	7.6	119.9	7.0	126.9	76.8	35.8	+ 14.3
1968	152.0	4.5	9.5	5.7	171.7	5.9	177.6	65.1	30.0	+ 82.5
1969	149.2	4.2	3.5	11.1	168.0	4.2	172.2	196.1	34.1	- 58.0
1970	186.3	3.5	5.4	10.9	206.1	5.5	211.6	158.8	31.4	+ 21.4
1971	244.0	4.9	5.9	10.2	265.0	7.5	272.5	229.9	26.5	+ 16.1
1972	167.0	5.0	5.1	11.3	188.4	9.4	197.9	193.2	29.8	- 34.5
1973	200.5	7.4	1.7	15.0	224.6	6.7	231.4	247.8	26.5	- 42.9
1974	217.0	5.8	6/	14.1	238.0	12.4	250.3	199.1	35.0	+ 16.2
1975	213.3	6.4	6/	25.9	245.7	11.3	256.9	191.8	36.8	+ 28.3
1976	186.4	6.3	6/	11.8	204.6	20.9	225.5	179.2	38.4	+ 7.8
1977	116.1	3.8	6/	13.2	133.2	13.7	146.9	90.6	35.4	+ 20.8
1978	284.0	4.4	6/	7.9	296.3	16.0	312.3	222.0	33.8	+ 56.5

1/ Excludes whale and sperm oils.

2/ Excludes liver, whale and sperm oils.

3/ Production plus imports.

4/ Does not include exports of foreign merchandise.

5/ Not available.

6/ Included with other.

Note: Figures may not add to total because of rounding.

Table A15.--U.S. PRODUCTION OF FISH OIL BY SPECIES, BY MONTH, 1973-77 AVERAGE, AND 1978-79

	ANCHOVY			MENHADEN			TUNA AND MACKEREL			UNCLASSIFIED			TOTAL		
	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979	1973-77 AVERAGE	1978	1979
- MILLION POUNDS -															
JANUARY	0.5	0.1	(1)	(2)	0.1	0.8	0.3	0.2	0.2	0.2	0.3	0.2	1.1	0.7	1.1
FEBRUARY	0.1	-	(1)	-	-	-	0.3	0.3	0.2	0.2	0.3	0.2	0.6	0.6	0.4
MARCH	0.1	(3)	-	-	-	-	0.5	0.2	0.3	0.2	0.3	0.3	0.8	0.5	0.6
1ST QTR	0.7	0.1	(1)	(2)	0.1	0.8	1.1	0.8	0.7	0.6	0.9	0.7	2.5	1.8	2.2
APRIL	0.3	-	(1)	4.8	16.1	3.1	0.5	0.3	0.2	0.3	0.2	0.2	6.0	16.6	3.5
MAY	0.2	(4)	0.3	22.7	29.4	30.0	0.4	0.5	0.5	0.7	0.5	0.4	24.0	30.4	31.2
JUNE	-	(4)	(1)	35.7	61.4	56.4	0.5	0.3	0.3	1.0	0.6	0.8	37.2	62.3	57.4
2ND QTR	0.4	(4)	0.3	63.2	107.0	89.5	1.4	1.0	1.0	2.0	1.3	1.4	67.1	109.3	92.2
JULY	-	-	-	44.8	50.7	-	0.5	0.4	-	1.6	1.6	-	47.0	52.7	-
AUGUST	0.1	(4)	-	38.6	57.9	-	0.6	0.6	-	1.3	1.2	-	40.6	59.8	-
SEPTEMBER	1.0	0.2	-	27.7	42.6	-	0.6	0.6	-	1.3	1.0	-	30.6	44.4	-
3RD QTR	1.0	0.2	-	111.1	151.3	-	1.8	1.5	-	4.2	3.9	-	118.1	156.9	-
OCTOBER	1.8	-	-	10.0	23.9	-	0.7	0.4	-	1.0	0.6	-	13.5	24.9	-
NOVEMBER	2.3	0.3	-	1.6	0.7	-	0.6	0.3	-	0.3	0.4	-	4.8	1.7	-
DECEMBER	1.7	0.2	-	0.7	1.1	-	0.5	0.3	-	0.2	0.1	-	3.2	1.6	-
4TH QTR	5.9	0.4	-	12.4	25.7	-	1.9	1.0	-	1.4	1.1	-	21.5	28.3	-
TOTAL	8.1	0.8	0.3	186.7	284.0	90.3	6.2	4.4	1.7	8.3	7.1	2.0	209.2	296.3	94.4

(1) NOT REPORTED SEPARATELY.

(2) LESS THAN 50,000 POUNDS.

(3) INCLUDED WITH JANUARY.

(4) INCLUDED WITH SEPTEMBER.

NOTE: FIGURES MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.
1979 FIGURES SUBJECT TO REVISION.

SOURCE: NMFS, RESOURCE STATISTICS DIVISION.

TABLE A 16--U.S. EXPORTS, DOMESTIC INDUSTRIAL USE, AND TOTAL DISAPPEARANCE OF FISH OIL,
BY MONTH, 1973-77 AVERAGE, AND 1977-79

	EXPORTS (1)				DOMESTIC DISAPPEARANCE (2)				TOTAL DISAPPEARANCE			
	1973-77 AVERAGE	1977	1978	1979	1973-77 AVERAGE	1977	1978	1979	1973-77 AVERAGE	1977	1978	1979
- MILLION POUNDS -												
JANUARY	6.3	0.7	2.5	1.0	2.4	2.2	3.1	3.3	8.8	2.9	5.7	4.3
FEBRUARY	2.9	1.0	2.4	8.5	2.5	2.7	2.0	1.9	5.4	3.7	4.4	10.5
MARCH	3.8	3.7	2.9	17.0	2.6	3.3	2.3	2.9	6.4	7.0	5.2	19.9
1ST QTR	12.9	5.4	7.8	26.6	7.6	8.1	7.5	8.0	20.5	13.6	15.2	34.6
APRIL	1.2	(3)	2.8	2.3	2.9	3.2	2.8	2.9	4.1	3.2	5.6	5.2
MAY	3.9	1.5	8.5	17.5	2.9	3.3	3.0	3.0	6.8	4.8	11.5	20.5
JUNE	22.9	15.0	16.1	13.5	2.8	2.6	2.7	3.3	25.7	17.7	18.8	16.8
2ND QTR	28.0	16.6	27.4	33.2	8.5	9.1	8.4	9.2	36.5	25.6	35.8	42.4
JULY	27.6	16.1	33.7		2.7	2.8	3.8		30.3	18.9	37.5	
AUGUST	41.6	31.5	84.2		3.5	3.0	3.0		45.2	34.6	87.1	
SEPTEMBER	16.7	5.7	15.1		3.3	3.4	3.2		20.0	9.0	18.3	
3RD QTR	86.0	53.3	133.0		9.5	9.2	9.9		95.5	62.5	143.0	
OCTOBER	29.1	6.9	20.8		2.9	2.4	3.1		32.0	9.3	23.9	
NOVEMBER	11.4	3.3	15.7		3.1	3.9	2.3		14.5	7.2	18.0	
DECEMBER	14.3	5.1	17.4		2.6	2.8	2.6		16.9	7.8	20.0	
4TH QTR	54.8	15.3	53.8		8.6	9.1	8.0		63.5	24.4	61.9	
TOTAL	181.7	90.6	222.0	59.8	34.2	35.4	33.8	17.2	216.0	126.1	255.8	77.1

(1) BEGINNING IN JANUARY 1978, MAY INCLUDE EXPORTS OF WHALE AND SPERM OIL.

(2) INCLUDES MARINE MAMMAL OIL OTHER THAN SPERM OIL AND SOME HYDROGENATED FAT (VEGETABLE AND ANIMAL)
AND OTHER FATS AND OILS IN PROCESS.

(3) LESS THAN 50,000 POUNDS.

SOURCE: BUREAU OF THE CENSUS; CURRENT INDUSTRIAL REPORT, FATS AND OILS: PRODUCTION, CONSUMPTION, AND STOCKS,
SERIES: M20K(73-79).

NOTE: FIGURES MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.

Table A 17--U.S. fish oil exports, annual, by country of destination, 1972-79

Country of destination	1972	1973	1974	1975	1976	1977	1978	1979 Jan.-June
-Thousand pounds-								
Canada	2,578	1,181	1,255	1,241	191	312	639	229
Mexico	124	195	309	198	269	284	303	116
Panama	68	-	-	-	-	-	4	-
Argentina	-	-	-	-	-	402	41	7
Colombia	-	10,667	8,846	-	26,598	5,576	18,302	15,905
Belgium/Luxemb.	2,250	1,212	-	4,797	11,305	1,102	5,584	2,844
Denmark	2,425	-	-	-	-	-	-	-
France	-	8	-	-	-	1,921	1,987	1,323
Germany, West	26,250	5,511	11,467	12,080	13,855	13,968	45,042	4,442
Italy	-	-	-	-	-	-	-	1
Netherlands	82,220	146,386	147,067	55,408	82,905	52,554	81,968	17,097
Norway	9,171	-	11,038	-	1,323	2,200	1,125	-
Sweden	61,558	37,980	13,889	41,577	2,212	3,272	8,745	1,103
United Kingdom	11	41,388	4,122	74,628	34,088	7,938	50,600	10,185
Japan	49	22	-	-	-	-	251	-
Lebanon	1,212	2,583	442	1,342	-	-	2	-
South Africa	4,590	-	-	-	5,176	-	-	-
Australia	535	583	561	-	664	696	7	882
Other countries	157	77	125	572	364	408	7,410	5,672
Total	193,198	247,793	199,122	191,843	179,235	90,633	222,012	59,805

Note: Figures may not add to total because of rounding.

Source: Bureau of the Census.

TABLE A18.--SELECTED AVERAGE MONTHLY PRICES OF FISH AND SOYBEAN OILS, AND PRICE RATIO OF MENHADEN OIL TO SOYBEAN OIL, 1977-79

	ANCHOVY (1)	MENHADEN (2)	TUNA (3)	NORTHWEST EUROPE (4)	SOYBEAN (5)	MENHADEN OIL TO SOYBEAN OIL
	----- CENTS PER POUND -----					- PRICE RATIO -
1977						
JANUARY	14.00	18.60	9.30	19.39	20.90	0.89
FEBRUARY	14.00	19.19	9.50	20.00	22.40	0.86
MARCH	14.00	21.25	9.38	22.54	26.50	0.80
APRIL	14.00	23.88	9.50	25.31	29.60	0.81
MAY	14.00	25.60	9.50	26.17	31.30	0.82
JUNE	(6)	25.63	12.00	24.45	28.30	0.91
JULY	(6)	21.38	12.38	21.11	23.80	0.90
AUGUST	(6)	20.00	12.50	19.73	21.10	0.95
SEPTEMBER	(6)	20.00	12.63	18.69	19.20	1.04
OCTOBER	15.13	19.05	12.80	19.84	18.80	1.01
NOVEMBER	15.50	18.75	11.00	19.16	21.00	0.89
DECEMBER	15.50	19.88	10.50	20.28	22.60	0.88
AVERAGE	14.52	21.10	10.92	21.39	23.79	0.89
1978						
JANUARY	(6)	20.00	(6)	20.13	20.90	0.96
FEBRUARY	(6)	20.00	(6)	20.01	21.60	0.93
MARCH	(6)	20.63	(6)	21.46	26.60	0.78
APRIL	(6)	21.00	(6)	21.55	26.80	0.78
MAY	(6)	21.00	(6)	21.66	28.80	0.73
JUNE	(6)	20.88	(6)	22.14	26.90	0.78
JULY	(6)	19.95	(6)	19.67	25.90	0.77
AUGUST	(6)	18.88	(6)	19.50	26.30	0.72
SEPTEMBER	(6)	19.19	10.50	20.41	27.80	0.69
OCTOBER	(6)	19.70	10.50	20.36	27.17	0.73
NOVEMBER	(6)	19.75	10.75	19.78	24.91	0.79
DECEMBER	(6)	19.38	10.75	18.67	25.30	0.77
AVERAGE	-	20.03	10.63	20.44	25.75	0.78
1979						
JANUARY	(6)	19.05	11.00	18.99	25.80	0.74
FEBRUARY	(6)	19.00	11.00	20.01	27.30	0.70
MARCH	(6)	19.25	11.00	21.55	26.90	0.72
APRIL	(6)	20.50	11.40	21.94	26.70	0.77
MAY	(6)	20.75	11.50	21.44	27.80	0.75
JUNE	(6)	20.75	11.44	20.53	27.41	0.76
JULY	(6)	20.15	11.50	20.58	29.07	0.69
AUGUST						
SEPTEMBER						
OCTOBER						
NOVEMBER						
DECEMBER						
AVERAGE	-	19.92	11.26	20.72	27.28	0.73

(1) CRUDE OIL, F.O.B. PLANTS, QUOTED AT LOS ANGELES.

(2) CRUDE OIL, TANK CARS, F.O.B. EAST COAST PLANTS, QUOTED AT NEW YORK CITY.

(3) CRUDE OIL, F.O.B. PLANTS, QUOTED AT LOS ANGELES.

(4) CRUDE OIL, ANY ORIGIN, C.I.F. NORTHWEST EUROPE, QUOTED AT HAMBURG.

(5) CRUDE OIL, TANK CARS, F.O.B., DECATUR, ILL.

(6) SUPPLIES EXHAUSTED, NO QUOTES.

SOURCE: FOR U.S. PRICES: NMFS, RESOURCE STATISTICS DIVISION.

FOR NW. EUROPE PRICES: OIL WORLD, ISTA MIELKE & CO., HAMBURG, FEDERAL REPUBLIC OF GERMANY.

FOR SOYBEAN OIL PRICES: FATS AND OILS SITUATION, U.S. DEPARTMENT OF AGRICULTURE.

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